

# Taxonomic Studies of the Subfamily Acridinae (Acrididae : Orthoptera) from Pakistan

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## ABSTRACT

This study includes, twelve acridid species in five genera, viz., *Acrida gigantea* (Herbst), *A. turrita* (Linnaeus), *A. lugubris* Burr, *A. exaltata* (Walker), *Gonista rotundata* Uvarov, *Phlaeoba infumata* Brunner, *P. panteli* I. Bolivar, *Ceracris deflorata* (Brunner), *C. nigricornis nigricornis* Walker, *C. nigricornis laeta* (I. Bolivar), *Duroniella gracilis* Uvarov and *D. laticornis* (Krauss), have been recorded from various localities of Pakistan. Measurements of various body parts, habitat and distribution of each species are given in this paper.

**Key Words:** Taxonomy; Acridinae; Pakistan

## INTRODUCTION

Grasshoppers belonging to the subfamily Acridinae are purely graminivorous and attack on maize and different pulse crops (Harris, 1937; Bohalen, 1973). Their body are medium to large sized and well adapted to long grasses and the enlarged head capsule is well developed for the large mandibular muscles required to attack dry and coarse grasses.

This subfamily from Sub-Continent has been studied by Kirby (1914), Bei-Bienko and Mischenko (1951) and Dirsh (1965), whereas, Ahmad (1958), Moeed (1971), Perwin and Ahmad (1983), Wagan (1990) and Malik *et al.* (1993) studied and described some species from Pakistan. As no detailed taxonomic work on this subfamily has been done in Pakistan. In view of this scanty work, the present taxonomic studies have been initiated to explore the acridid grasshopper fauna alongwith its habitat and distribution in Pakistan.

In the present work, twelve species in five genera, viz., *Acrida gigantea* (Herbst), *A. turrita* (Linnaeus), *A. lugubris* Burr, *A. exaltata* (Walker), *Gonista rotundata* Uvarov, *Phlaeoba infumata* Brunner, *P. panteli* I. Bolivar, *Ceracris deflorata* (Brunner), *C. nigricornis nigricornis* Walker, *C. nigricornis laeta* (I. Bolivar), *Duroniella gracilis* Uvarov and *D. laticornis* (Krauss) have been recorded from various localities of Pakistan. Geographically this country is situated in the North-West of South Asia and extends North-South from 24-37 N latitude and 61-75 E longitude comprising of about 59% high mountains and table lands in the North and West, while the remaining 41% is sandy deserts, barren plateau, fertile plains in the middle alongwith coastal beaches and marshy swamps in the South. It is distributed into four provinces i.e. Punjab, Sind,

Baluchistan and NorthWest Frontier Province (NWFP) with varied types of land, climate and crops.

The collected acridid specimens were killed in a cyanide bottle, pinned and their body parts set on appropriate setting boards. On drying, these were labeled and mounted in collection boxes. Naphthalene balls were kept in the boxes for the safety of the specimens. A revolving stage and a wild M3B binocular microscope (10X x 6.4X, 10X x 16X, 10X x 40X) were used for identifying the specimens up to the specific level. Deviating characters of these species, if any, from published descriptions by Kirby (1914), Bei-Bienko and Mischenko (1951), Ahmad (1958), Wagan (1990), measurements (max. length "L" & width "W") of various body parts and their collection data, are given in this paper. The meteorological data of the localities for each species are given in the Appendix. Abbreviation: M=male and F=Female.

### 1. Genus *Acrida* Linnaeus.

**Type: *Acrida turrita* (Linnaeus).** Four species have been recorded in this genus. They exactly tally with the published description (Kirby, 1914; Bei-Bienko & Mischenko, 1951; Ahmad, 1958; Dirsh, 1965) of this genus except slight variation in measurements of various body parts given in each species.

**1.1. *Acrida gigantea* (Herbst).** *Truxalis giganteus* Herbst, 1786. Fuess. J.G. Arch. Ins., 7-8: 191. *Tryxalis*

### Measurements (mm): (5M 6 F)

	Male	Female	Mean	S.D
Body (L)	29.50-31.00	47.00-54.00	38.35	10.18
Pronotum (L)	8.25- 9.00	9.50-10.00	9.17	0.47
Pronotum (W)	4.25- 4.75	4.75- 5.25	4.77	0.24
Tegmen (L)	25.00-27.00	38.50-43.50	31.85	7.05
Tegmen (W)	4.00- 4.50	4.75- 5.25	4.67	0.33
Hind femur (L)	28.00-28.75	31.00-32.00	29.7	1.48
Hind femur (W)	1.75- 2.00	2.00- 2.50	2.05	0.19

*giganteus* Kirby, 1902. Uganda Prot., 1: 468. *Acrida gigantea* Kirby, 1910. Syn. Cat. Orth., 3(2): 93.

**Material examined.** Faisalabad 2M, 18-VI-93, 1F, 5-VII-94; Haroonabad (Bahawalpur) 1M 2E, 20-IX-93; Lal Sohanra (Bahawalpur) 1M 1F, 18-IX-92; Dera Ismail Khan 1M, 19-VII-94; Peshawar 1M, 21-VI-1993, 1F, 16-VII-94.

**Habitat.** This species has been collected from the cultivated fields with maize and sorghum crops, near roadsides and water channels having tall grasses.

**New record.** All above localities except Faisalabad, Haroonabad and Bahawalpur. Earlier, Ahmad (1958), Latif *et al.* (1959) and Malik *et al.* (1993) reported this species from the Punjab.

**1.2. *Acrida turrita* (Linnaeus).** *Gryllus* (*Acrida*) *turritus* Linnaeus, 1758. Syst. Nat., ed. 10,1: 427. *Gryllus* (*Acrida*) *nasutus* Linnaeus, 1764. Mus. Ludov. Ulric., p.118. *Gryllus turritus* Fabricius, 1775. Syst. Ent., p. 279. *Truxalis nasutus* Fabricius, 1775. Ibid., p.279. *Acrida* (*Truxalis*) *turrita* Gmelin, 1790. Syst. Nat., ed. 13,1(4): 2056. *Truxalis turrita* Rossi, 1790. Etrus., 1: 263. *Truxalis rufescens* Beauvois, 1805. Ins. Afr. Amer., p.17. *Truxalis tenuis* Beauvois, 1805. Ibid., p.17. *Tryxalis turrita* Charpentier, 1841. Germ. Z. Ent., 3: 305. *Acrida turrita* Stal, 1873. Recens. Orth., 1: 96. *Acrida rufescens* Stal, 1873. Ibid., p.97. *Acrida acuminata* I.Bolivar, 1882. J. Sci. math. phys.nat., Lisb., 8: 116. *Tryxalis rufescens* I.Bolivar, 1889. J. Sci. Acad. Lisb., (2)1: 92. *Tryxalis* (*Acrida*) *turrita* Saussure, 1895. Ann. Mus. Stor. nat.Geneva, 15: 93. *Tryxalis nasuta* Finot, 1895. Ann. Soc. ent. Fr., 64: 412. *Acrida maxima* Karny, 1907. S. B. Akad. Wiss Wien, 116: 373. *Acrida turrita uvarovi* I.Bolivar, 1936. Eos. Madr., 11: 408. *Acrida turrita turrita* Jannone, 1938. Bull. Lab. Zool. Portici., 30: 94. *Acrida uvarovi* Dirsh, 1949. Eos Madr., 25: 21,29. *Acrida lineata* Dirsh, 1949. Ibid., p. 16, 21, 22. *Acrida turrita tunetana* Dirsh, 1949. Ibid., p. 23,25. *Acrida turrita sicula* Dirsh, 1949. Ibid., p.27.

**Measurements (mm): (14 M 16 F)**

	Male	Female	Mean	S.D.
Body (L)	33.00-35.00	50.00-51.50	43.78	8.15
Pronotum (L)	5.50 - 6.25	9.00- 9.50	7.92	1.61
Pronotum (W)	3.00- 3.25	4.00- 4.50	3.78	0.55
Tegmen (L)	26.50-29.00	41.00-42.00	33.94	9.70
Tegmen (W)	3.00- 3.25	4.00- 4.25	3.75	1.61
Hind femur (L)	21.50-22.00	28.00-29.00	25.64	3.22
Hind femur (W)	1.50- 1.75	1.75- 2.25	1.85	0.21

**Material examined.** Bahawalpur 2M 3F, 18-IX-93, Lal Sohanra (Bahawalpur) 1G, 18-IX-92; Faisalabad 3M 5F, 18-VI-94, 1E, 5-VII-94; Islamabad 1G 1E, 28-VII-94; Jhelum 1M, 28-VII-94; Chakwal 1G, 20-VII-95; Lahore 2G 1F, 5-IX-94; Murree 1F, 5-IX-93.

**Habitat.** It has been collected from thick grasses and maize fields near roadsides and water channels.

**New record.** It has already been recorded from different localities of the Punjab by Malik *et al.* (1993) except Murree; Ahmad (1958) and Latif *et al.* (1959) from Faisalabad and Moeed (1971) and Wagan (1984) from Hyderabad.

**1.3. *Acrida lugubris* Burr.** 1902. *Acrida lugubris* Burr, Trans. ent. Soc. Lond., p.157,170. The male specimens of this species conform to the published description of Kirby (1914) of this species. Bei-Bienko & Mishchenko (1951) synonymised *Acrida lugubris* with *Acrida exaltata*, but the former is quite different from the latter in having the dusky markings in the apical half and pinkish border of tegmin. In the present work, the views of Burr (1902) and Kirby (1914) regarding these species are upheld and they are, therefore, treated as separate species.

**Measurements (mm): (4 M)**

	Male	Mean	S.D.
Body (L)	33.50-34.75	34.06	0.51
Pronotum (L)	5.25- 5.75	5.50	0.20
Pronotum (W)	3.00- 3.25	3.12	0.14
Tegmen (L)	26.00-28.50	27.37	1.10
Tegmen (W)	3.00	3.00	0.00
Hind femur (L)	20.00-20.50	2.25	0.20
Hind femur (W)	1.25- 1.50	1.37	0.14

**Material examined.** Islamabad 2M, 28-VII-94; Mingora (Swat) 1M, 15-VII-94; Murree 1M, 30-VII-94.

**Habitat.** Only male specimens of this species have been collected from the tall grasses near water source and roadsides.

**New record.** It has been recorded for the first time from Mingora. This species has already been recorded from Hyderabad by Moeed (1971) and Wagan (1984) and from Islamabad and Murree by Malik *et al.* (1993).

**1.4. *Acrida exaltata* (Walker).** *Truxalis exaltata* Walker, 1859. Ann. Mag. Nat. Hist., (3)4: 222. *Truxalis brevicollis* I.Bolivar, 1892. Ann. Soc. ent. Fr., 70: 533. *Tryxalis brevicollis* I.Bolivar, 1893. Feuille. Jeun. Nat., 23: 162,164. *Acrida brevicollis* Burr, 1902. Trans. ent. Soc. Lond., p.157. *Acrida exaltata* Kirby, 1914. Faun. Brit. Ind. Acrid., p.98,99.

**Measurements (mm): (11 M 12 F)**

	Male	Female	Mean	S.D.
Body (L)	32.50-37.00	47.50-50.00	42.36	6.30
Pronotum (L)	5.00- 5.50	9.00- 9.75	7.52	2.08
Pronotum (W)	2.50- 3.00	4.75- 5.00	3.94	0.99
Tegmen (L)	26.00-29.50	41.50-43.00	35.83	7.22
Tegmen (W)	3.00- 3.25	4.25- 4.50	3.80	0.57
Hind femur (L)	19.00-20.00	30.00-31.00	25.56	5.57
Hind femur (W)	1.50- 1.75	2.00- 2.50	1.98	0.31

**Material examined.** Dera Ismail Khan 1M 1F, 19-VII-93; Multan 1F, 8-VII-93, 1M, 13-XI-94; Lorali 1M 1F, 17-VIII-95; Makran coast 1F, 8-IX-95; Khuzdar 1F, 13-VIII-95; Faisalabad 1G 1F, 20-III-93, 1F, 8-IX-94; Hyderabad 1G 2F, 12-X-94; Badin (Tharparkar)

2M,14-X-94; Karachi 1M 2F,9-X-94; Peshawar 1F,16-VII-94; Jhelum 2M,28-VII-94.

**Habitat.** The specimens of this species have been collected from vegetation of tall grasses near apple orchards and cultivated fields of maize, sorghum and fodder crops.

**New record.** Except Makran coast, all above localities have already been reported by Ahmad (1975-80) and Perwin *et al.* (1985) for this species. Wagan (1990) reported this species from Sindh, Khan (1990) from Baluchistan and Ahmad (1958), Latif *et al.* (1959), Irshad *et al.* (1977) and Malik *et al.* (1993) from the Punjab.

## 2. Genus *Gonista* I. Bolivar

**Type:** *Gonista bicolor* (Haan). One species has been collected in this genus, that agree with the published description (Kirby 1914, Bei-Bienko & Mishchenko 1951, Johnsen 1984) of this genus. Slight variation in measurements of various body parts given in the species.

**2.1. *Gonista rotundata* Uvarov.** *Gonista rotundata* Uvarov, 1933. *Trudy zool. Inst. AN SSSR.*, 1: 189.

### Measurements (mm): (4M 5F)

	Male	Female	Mean	S.D.
Body (L)	40.0-40.50	52.50-59.00	49.60	8.84
Pronotum (L)	6.50-7.00	8.50-11.50	8.70	2.07
Pronotum (W)	3.00-3.50	4.50-5.25	4.25	0.96
Tegmen (L)	32.50-33.00	37.50-48.00	39.20	7.02
Tegmen (W)	3.50	4.75-5.25	4.40	0.84
Hind femur (L)	16.50-17.00	22.00-24.00	20.50	3.50
Hind femur (W)	2.00-2.50	2.50-3.00	2.50	0.35

**Material examined.** Jhang 1M 1F, 12-VII-93; 1F,22-VI-94; Bhakkar (Thal) 1M,20-X-93; Loralai 1M 1F,17-VIII-94; Zhob 1M 1F,27-VII-93; 1F,18-VIII-94.

**Habitat.** The collected specimens occur in the scattered vegetation of grasses near barren land and cotton fields.

**New record.** All above localities except Jhang. This species has already been recorded from Jhang by Malik *et al.* (1993).

## 3. Genus *Phlaeoba* Stal

**Type:** *Phlaeoba rustica* (Stal). Two species have been recorded in this genus. They tally with the published description (Kirby 1914, Bei-Bienko & Mishchenko 1951) of this genus.

**3.1. *Phlaeoba infumata* Brunner.** *Phlaeoba infumata* Brunner, 1893. *Ann. Mus. Stor. nat. Genova*, (2): 13: 124. The collected specimens tally with the published description (Kirby 1914, Bei-Bienko & Mishchenko 1951) of this species except that the outer carinae of hind femora are not distinctly dotted with black and slight variation in measurements of various body parts.

### Measurements (mm): (9 M 14 F)

	Male	Female	Mean	S.D.
Body (L)	20.00-22.50	28.50-32.00	26.17	3.82
Pronotum (L)	3.00-4.50	5.50-6.00	4.90	0.96
Pronotum (W)	2.75-3.00	3.50-4.00	3.43	0.41
Tegmen (L)	19.50-21.50	26.00-28.50	24.20	3.15
Tegmen (W)	2.75-3.00	3.50-3.75	3.28	0.35
Hind femur (L)	13.00-13.50	17.50-18.25	16.10	2.25
Hind femur (W)	2.50-3.00	3.25-3.50	3.11	0.28

**Material examined.** Jhelum 2M 3F, 15-VII-1993; 3M 5F,28-VII-94; Kallar Kahar (Chakwal) 2M 3F,2-VIII-93; Peshawar 1M 2F,16-VII-94; Mardan 1M, 17-VII-94; Bhakkar (Thal) 1F,20-X-93.

**Habitat.** This species has been collected from grasses and cultivated fields of maize, sorghum and millets.

**New record.** It has only been recorded from N.W.F.P. and the Punjab Earlier, Ahmad (1958), Latif *et al.* (1959), Ahmad (1975-80), Perwin *et al.* (1983, 1985) and Malik *et al.* (1993) reported this species from different localities of the Punjab.

**3.2. *Phlaeoba panteli* I. Bolivar.** *Xiphocera fumida* Walker, 1870. *Cat. Derm. Salt. Brit. Mus.N.H.*, 3: 513. *Phlaeoba panteli* I. Bolivar, 1902. *Ann. Soc. ent. Fr.*, 70: 589. *Phlaeoba walhousci* Kirby, 1910. *Syn. Cat. Orth.*, 3 2): 138. It totally tallies with the published description of Kirby (1914) of this species except slight variation in size.

### Measurements(mm): (11 M 11 F)

	Male	Female	Mean	S.D.
Body (L)	19.50-22.00	27.00-28.00	24.15	3.11
Pronotum (L)	3.50-4.00	5.00-5.75	4.45	0.81
Pronotum (W)	2.50-3.00	3.50-3.75	3.13	0.46
Tegmen (L)	18.00-20.00	25.50-26.50	22.46	3.30
Tegmen (W)	2.50-2.75	3.25-3.50	3.02	0.37
Hind femur (L)	10.50-12.00	16.50-17.50	13.85	2.88
Hind femur (W)	2.00-2.50	3.00-3.50	2.69	0.48

**Material examined.** Warsak Dam (Peshawar) 2M 1F, 16-VII-94; Faisalabad 2G,4-V-93; 8-III-94; Abbottabad 1F,13-VII-94; Dera Ismail Khan 2M,12-VII-94; Lahore 2M 3F,24-IX-93; Chakwal 1F,20-VII-94; Khuzdar 1 F,13-VIII-94; Hyderabad 1M 1F,10-X-94; Sukkar 1M,12-X-94; Cholistan 1F,16-IX-93; Rawalpindi 1M 2F,3-IX-94.

**Habitat.** The specimens of this species have been collected from grasses near roadsides and cultivated fields of maize, rice, millets, ground nut, alfalfa and sugarcane crops.

**New record.** All above localities. Earlier, Ahmad (1975-80), Irshad *et al.* (1977) and Perwin *et al.* (1985) reported this species all over Pakistan, while Malik *et al.* (1993) only from Chhanga Manga (Punjab).

## 4. Genus *Ceracris* Walker

**Type:** *Ceracris nigricornis* Walker. Three species have been collected in this genus. They exactly tally with the published description (Kirby 1914, Bei-

Bienko & Mishchenko, 1951) of this genus.

**4.1. *Ceracris deflorata* (Brunner).** *Duronia deflorata* Brunner, 1893. *Ann. Mag. Stor. nat. Genova*, 2(13): 126. *Ceracris deflorata* Kirby, 1914. *Faun. Brit. Ind. Acrid.*, p.112. The collected specimens exactly compare with the published description of Kirby (1914) of this species except slight variation in size.

**Measurements (mm): (4 M 4 F)**

	Male	Female	Mean	S.D.
Body (L)	17.00-20.00	23.00-25.00	21.00	3.16
Pronotum (L)	3.00- 3.50	4.50- 5.25	4.06	0.85
Pronotum (W)	2.25- 2.50	3.50- 3.75	3.03	0.64
Tegmen (L)	14.00-16.50	20.00-21.50	17.94	2.74
Tegmen (W)	2.00	3.25	2.62	0.6611
Hind femur (L)	11.00-12.00	14.00-15.50	13.12	1.70
Hind femur (W)	2.25- 2.50	3.00- 3.25	2.78	0.38

**Material examined.** Lal Sohanra (Bahawalpur) 2E,18-IX-94; Rahim Yar Khan (Cholistan) 2M 1F,15-IX-94; Bhakkar (Thal) 1M 1F,20-X-93; Multan 1M,13-XI-93.

**Habitat.** This species occurs in the scattered vegetation of grasses, herbs and shrubs near the desert areas of Pakistan.

**New record.** All above localities except Bahawalpur. Earlier, Malik *et al.* (1993) recorded this species from the Punjab.

**4.2. *Ceracris nigricornis nigricornis* Walker.** *Ceracris nigricornis* Walker, 1870. *Cat. Derm. Salt. Brit. Mus. (N.H.)*, 4: 791. *Duronia versicolor* Brunner, 1893. *Ann. Mus. Stor. nat. Genova*,(2)13: 126. *Ceracris versicolor* Kirby, 1914. *Faun. Brit. Ind. Acrid.*, p.110-111. *Ceracris nigricornis nigricornis* Bei-Bienko & Mishchenko, 1951. *keys Faun. USSR.*, 40: 463.

It agrees with the published description (Kirby, 1914; Bei-Bienko & Mishchenko, 1951) of this species except the following characters and size: 1. Hind tibiae with 12 - 13 black tipped spines instead of 9-10.2. Hind femora in both sexes with reddish ventral aspect.

**Measurements (mm): (5 M 8 F)**

	Male	Female	Mean	S.D.
Body (L)	20.00-21.00	29.50-30.50	26.34	4.74
Pronotum (L)	4.00- 4.25	5.50- 5.75	5.01	0.72
Pronotum (W)	3.00-3.50	3.30	0.25	
Tegmen (L)	19.00-20.00	24.50-25.00	22.67	2.54
Tegmen (W)	2.50- 2.75	3.50- 4.00	3.30	0.56
Hind femur (L)	14.00-14.50	16.00-16.50	15.48	1.03
Hind femur (W)	2.75- 3.00	3.00- 3.50	3.07	0.23

**Material examined.** Chhanga Manga (Kasur) 1G 3E,30-VIII-93; Bhakkar (Thal) 1M 2 F,20-X-93; Cholistan 1M 1F,16-IX-93; Badin (Tharparkar) 2M,14-X-94, Nushki (Kharan) 1F,12-VIII-94; Dera Ismail Khan 1F,19-VII-94.

**Habitat.** The specimens of this species have been collected from the scattered dried vegetation of grasses

and bushes. Some of them have been found in the vegetation fields near roadsides.

**New record.** All above localities except Chhanga Manga. Earlier, it has been recorded by Malik *et al.* (1993) from Kasur District (Punjab).

**4.3. *Ceracris nigricornis laeta* (I.Bolivar).** *Kuthya laeta* I.Bolivar, 1914. *Trab. Mus. Cienc. nat. Madr.*, 20: 79. *Parapleurus armillatus* Karny, 1915. *Supple.Ent.*, 4: 83. *Geea conspicus* Caudell, 1921. *Proc. Ent. Soc. Wash.*, 23,3: 30. *Ceracris nigricornis* Uvarov, 1925. *Ann. Mag. nat. Hist.*,(9)16: 13. *Ceracris nigricornis laeta* Bei-Bienko & Mishchenko, 1951. *keys Faun. USSR.*, 40: 463. The collected specimens match with the published description of Bei-Bienko & Mishchenko (1951) except that the hind femur in both sexes is with reddish ventral aspect and size.

**Material examined.** Lal Sohanra (Bahawalpur) 5M 2F,18-IX-94; Rahim Yar Khan 1F, 15-IX-93; Dera Ismail Khan 2M,19-VII-94.

**Habitat.** It has been collected from barren land having

**Measurements (mm): (7 M 3 F)**

	Male	Female	Mean	S.D.
Body (L)	22.00-23.00	33.00-34.00	25.75	5.25
Pronotum (L)	.00- 4.50	5.50- 6.00	4.75	0.67
Pronotum (W)	3.00- 3.25	4.00- 4.25	3.42	0.47
Tegmen (L)	21.50-23.00	27.50-28.00	24.05	2.55
Tegmen (W)	3.25- 3.50	3.50- 3.75	3.50	0.11
Hind femur (L)	13.00-13.50	17.00-18.00	14.52	1.96
Hind femur (W)	2.75- 3.00	3.50- 4.00	3.15	0.39

vegetation of grasses, herbs and shrubs near canals and roadsides.

**New record.** Above localities except Bahawalpur. The specimens of this species have only been recorded from the Punjab and N.W.F.P. Earlier, Malik *et al.* (1993) reported this species from Bahawalpur.

**5: Genus *Duroniella* I. Bolivar**

**Type: *Duroniella lucasii* (I.Bolivar).** Two species have been recorded in this genus. They exactly tally with the published description (Bei-Bienko & Mishchenko 1951, Dirsh 1965, Wagan 1990) of this genus, except slight variation in measurements of various body parts given in each species. 5.1: *Duroniella gracilis* Uvarov/*Duroniella gracilis* Uvarov, 1926. *Eos Madr.*, 2: 331.

**Measurements(mm): (21 M 28 F)**

	Male	Female	Mean	S.D.
Body (L)	17.00-18.75	22.00-25.00	21.06	2.44
Pronotum (L)	3.00- 3.50	4.00- 4.50	3.85	0.48
Pronotum (W)	2.50- 3.00	2.75- 3.25	2.85	0.24
Tegmen (L)	15.00-16.00	17.00-19.00	16.88	1.29
Tegmen (W)	2.00- 2.25	2.50- 3.00	2.49	0.34
Hind femur (L)	10.00-10.50	11.00-12.50	11.17	0.83
Hind femur (W)	2.25- 2.50	2.25- 2.50	2.40	0.12

**Material examined.** Bahawalpur 2M 2F,18-IX-94; Dera Ismail Khan 1M 3F,19-VII-94; Peshawar 1M,16-

VII-94; Mardan 2M 3F,17-VII-94, Hyderabad 2M 2F,11-X-94; Badin (Tharparkar) 3M 2F,14-X-94; Karachi 2F,10-X-94; Makran coast 2F,8-IX-95; Faisalabad 2M 3F,4-III-94; Lahore 1M,2-XI-94; Lorali 2M,17-VII-94; Khuzdar 2M 2F,13-VII-94; Panjgur 1M 3F,17-VIII-94; Zhob 2F,18-VII-94; Sukkar 2M 2F,12-X-94.

**Habitat.** The specimens of this species have been collected among thick grasses in dry meadows near roadsides. Some of them occur in the vegetation near cotton, maize, millets and vegetable fields.

**New record.** All above localities except Bahawalpur. It has already been collected by Malik *et al.* (1993) from Bahawalpur, Chhanga Manga and Shorkot (Punjab).

**5.2: Duroniella laticornis (Krauss).** *Duronia laticornis* Krauss, 1909. *Verh. narurw. Ver. Karl.*, 21: 118,119. *Duroniella laticornis* Bei-Bienko & Mishchenko, 1951. *Keys Faun. USSR.*, 40: 416.

#### Measurements (mm): (9 M 14 F)

	Male	Female	Mean	S.D.
Body (L)	13.00-16.50	21.50-25.00	19.65	4.02
Pronotum (L)	2.50- 3.00	3.00- 3.50	2.93	0.29
Pronotum (W)	2.00- 2.50	2.50- 2.75	2.35	0.27
Tegmen (L)	12.00-15.00	15.00-19.00	15.26	1.84
Tegmen (W)	2.00	2.75	2.45	0.36
Hind femur (L)	8.00-10.00	10.00-14.00	10.65	1.73
Hind femur (W)	2.00- 2.25	2.25- 2.50	2.21	0.15

**Material examined.** Dera Ghazi Khan 1M,17-X-93; Makran coast 1M 1F,8-IX-93; Faisalabad 2M,5-III-94; Lahore 1F,20-XI-93; Jhelum 1M,1-XI-94; Peshawar 1M 2F,16-VII-94; Murree 2F,14-VI-94; Mingora (Swat) 1M 2F,15-VII-94; Zhob 2F,18-VII-94; Khuzdar 1M 2F,13-VIII-94; Badin (Tharparkar) 1M 2F,14-X-94.

**Habitat.** This species has been collected from grasses in meadows, damp places and near roadsides. Some specimens of this species have been found in sugarcane and sorghum fields.

**New records.** All above localities except Dera Ghazi Khan and Sindh province. It has already been recorded from different localities of Sindh by Moeed (1971) and Wagan (1990), while Malik *et al.* (1993) recorded it from the Punjab.

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#### Appendix. Latitude, Longitude, Altitude, Temperature and Rainfall of the Grasshoppers collection localities of Pakistan

Collection locality	Latitude (m)	Longitude (m)	Altitude (m)	Mean Temp. (°C)	Ann. Ave. Precipitation (mm)
Abbottabad	43-10N	73-13E	1015	19.00	1400
Badin	24-85N	68-85E	30	26.00	210
Bahawalpur	29-25N	71-40E	115	26.50	162
Bhakkar	31-15N	72-18E	150	26.50	178
Chakwal	32-70N	72-38E	201	22.50	710
Chhanga Manga	31-35N	74-20E	210	22.50	405
Cholistan	28-25N	70-25E	83	26.50	112
D. G. Khan	30-02N	70-40E	125	26.50	165
D. I. Khan	31-50N	70-56E	215	25.00	290
Faisalabad	31-25N	73-06E	214	24.50	350
Hyderabad	25-24N	68-22E	30	26.50	162
Islamabad	33-45N	73-13E	530	20.50	1140
Jhang	31-16N	72-20E	153	26.00	178
Jhelum	32-56N	73-43E	233	23.50	800
Karachi	24-54N	67-08E	5	25.50	181
Khuzdar	27-47N	66-37E	1140	21.50	240
Lahore	31-34N	74-20E	215	24.00	450
Lorali	30-22N	68-35E	1432	20.00	194
Makran Coast	26-01N	63-09E	89	26.50	198
Mardan	34-30N	72-10E	293	23.00	310
Mingora	35-45N	72-25E	990	18.50	1000
Multan	30-12N	71-30E	121	26.50	168
Murree	34-10N	73-40E	2300	12.50	1750
Nushki	29-18N	64-42E	1018	19.00	211
Panjgur	26-58N	64-09E	919	23.00	104
Peshawar	34-01N	71-35E	319	22.50	344
Quetta	30-13N	66-57E	1586	15.50	340
Rawalpindi	33-40N	73-15E	507	21.50	1120
Sukkur	27-42N	68-50E	49	26.50	94
Zhob	31-20N	69-27E	1384	19.00	304

Source: - Meteorology Department

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